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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/871,723	06/04/2001	Ryuji Takahashi	Q63839	1424

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EXAMINER
WILSON, DONALD R

ART UNIT	PAPER NUMBER
1713	9

DATE MAILED: 11/15/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/871,723	TAKAHASHI ET AL.	
	Examiner	Art Unit	
	D. R. Wilson	1713	

-- The MAILING DATE of this communication appears on the cover she t with the correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-23 is/are pending in the application.

4a) Of the above claim(s) 15 and 20-23 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-14 and 16-19 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) 1-23 are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Restriction Requirement

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

   I. Claims 1-14 and 16-19, drawn to a packing material, classified in class 525, subclass 326.9.

   II. Claim 15, drawn to a solid phase extraction employing a column switching method, classified in class 210, subclass 660+.

   III. Claims 20-23, drawn to another solid phase extraction method, classified in class 210, subclass 660+.

2. The inventions are distinct, each from the other because:

3. Inventions of Group I are related to the inventions of Groups II and III as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product (MPEP § 806.05(h)). In the instant case product as claimed can be used in a materially different process of using that product such as absorption of other ions in bulk, or use as a catalyst.

4. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, and/or have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

Election of Species Requirement

5. This application contains claims directed to the following genera of patentably distinct species of the claimed invention:

   a. polymers containing hydrophobic groups and ion exchange groups (Groups I and II),

   b. method of introducing ion exchange group (Groups I and II),

   c. packing apparatuses (Group II),

   d. samples being extracted (Group II), and

e. objective components or impurities in extraction process (Group II).

6. As appropriate to the elected group of inventions applicant is required under 35 U.S.C. § 121 to elect a **single ultimate** disclosed specie for each of the above genera for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Where specific species are not identified in the claims applicant should elect specific specie from the specification. An alternative method of election is to identify an Example which collectively exemplifies the elected species. Currently, Claims 1 and 11-15 appear to be generic in their respective groups to the above species.

7. Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

8. Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

9. Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

Conclusion to Restriction/Election Requirement

10. During a telephone conversation with Mr. Bruce E. Kramer on 11/6/02 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-14 and 16-19, and the species as exemplified in Example I, wherein the ion exchange group is introduced by reaction with triethylamine, i.e., a copolymer of N-vinyl-2-pyrrolidone (NVP), divinylbenzene (DVB) and glycerol dimethacrylate, to which epoxy groups are introduced by reaction with epichlorohydrin, which is then reacted with triethylamine to form a copolymer with quaternary ammonium ions exchange groups. Affirmation of this election must be made by applicant in replying to this Office action. Claims 15 and 20-23 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 112, First Paragraph

11. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

12. ***Claims 1-7, 9-14 and 16-19 rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for,***

a. ***packing materials wherein the ion exchange group is covalently bonded to the polymer, does not reasonably provide enablement for packing materials wherein the ion exchange group is not covalently bonded to the polymer (Claims 1-7, 9-14 and 16-19), and***

b. ***packing materials made from a copolymer comprising a (meth)acrylic ester of a polyhydric alcohol and having a hydroxyl group, does not reasonable provide enablement for packing materials which still contain either a (meth)acrylic ester of a polyhydric alcohol and having a hydroxyl group (monomer), or a polymer with such a monomeric unit (Claims 6-7).***

The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims. In regards to (a), the only teaching within the specification is for packing materials wherein the ion exchange group is covalently bonded to the polymer. Claim 8 only differs form independent Claims 1 and 2 in that the ion exchange group is covalently bonded to the polymer. As Claim 8 is required to be further limiting, this therefore implies that the ion exchange group may be otherwise bonded to the polymer. However, the specification is void of any teaching of how effective ion exchange groups may be otherwise bonded to the polymer. In regards to (b), the only teaching within the specification is for packing materials which contain a copolymer of a (meth)acrylic ester of a polyhydric alcohol having a hydroxyl group, and wherein said hydroxyl group is further reacted to provide the ion exchange groups. Thus, the packing material polymers enabled by the specification no longer contain monomeric units of the hydroxy group containing monomer, particularly in amounts of 10% by mass or more.

Claim Rejections - 35 USC § 112, Second Paragraph

13. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

14. Claims 4, 6 and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

15. The language of Claim 4 is indefinite because "the hydrophobic monomer (A)" lacks antecedent basis in Claim 1.

16. The language of claim 6 is indefinite because "the hydrophilic monomer (B)" lacks antecedent basis in Claim 1.

17. Claim 14 is indefinite because it can not be told on what basis the average particle size is determined, e.g., number average, weight average, volume average, surface area average etc.

Claim Rejections - 35 USC § 102(b)/§ 103(a)

18. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

19. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

20. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

21. ***Claims 1-5, 8-14 and 16-19 are rejected under 35 U.S.C. 102(b) as anticipated by Lee.*** Lee is the US equivalent to WO'480.

22. Lee discloses ion exchange polymers containing both a hydrophobic group (e.g., DVB) and an ion exchange group (e.g., a sulfonate group or a quaternary ammonium group), as for example are exemplified in Examples 2 and 6. Said examples exemplify introducing the ion exchange group into a DVB/NVP copolymer. DVB/NVP copolymers containing 13, 14, 16, 20 and 22 mole% NVP, the remainder being made up of monomers from DVB of 80 % purity are exemplified in Example 1, which clearly teaches an aromatic divinyl compound in an amount of 30% by mass or more, as well as a NVP within the range of 5 to 60% by mass. Amounts of ion exchange groups well in excess of 5 μ-equiv/gram are exemplified for both the sulfonate and quaternary ammonium groups (e.g., Tables 1and 6). The resins preferably have a particle size of about 20 to about 200 μm (col. 6, lines 61-66). The use of columns and cartridges containing particles of the ion exchange resin are also disclosed (e.g., col. 10, line 46 to col. 11, line 16). As to any further limitations of Claims 11-13 and 16-19, these are seen as intended uses which do not impart patentability to the claimed subject matter.

23. Claims 1-6, 8-14, 16 and 18 are rejected under 35 U.S.C. 102(b) as anticipated by Miyake.

24. Miyake discloses strongly basic ion exchange resins from about 6 to about 98 wt.% of a quaternized dialkylaminoethylstyrene units and 2 to 94 wt.% cross-linking monomers (col. 1, lines 38-68). Quaternization is achieved by reaction with quaternizing agents such as for example methyl iodide or ethyl chloride (col. 13, lines 23-44, and Example 6). Examples of the polymers which can be quaternized are p-diethylaminoethylstyrene-DVB copolymers containing 18 or 36 wt.% DVB monomeric units (Examples 1 and 2). The amounts of ion exchange groups are well in excess of 5 μ-equiv per gram. Particle diameters of 50 to 200 μm are exemplified in Example 1. Packing of the copolymers into a column is also taught (col. 3, lines 8-13, an Example 3). The inclusion of other monoethenically unsaturated monomers is also taught in amounts preferably at most 60wt.% or more preferably at most 40 wt.%. Thus, one of ordinary skill in the art would have readily envisaged including 40 or 60 wt.& of the listed monomers in the ion exchange resins, among which both hydroxyethyl methacrylate (a

methacrylate ester of a polyhydric alcohol having a hydroxy group) and NVP are specifically disclosed as examples. As to any further limitations of Claims 11-13, 16 or 18, these are seen as intended uses which do not impart patentability to the claimed subject matter.

25. Claims 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyake as applied to Claims 1-6, 8-14, 16 and 18 above, and further in view of Lee.

26. Miyake discussed above is deficient in not disclosing cartridges as opposed to columns packed with the ion exchange materials. However, such is well known in applications using ion exchange materials for instance as is disclosed by Lee discussed above. It would have been obvious to one of ordinary skill in the art to use a cartridge as the form of a column in the ion exchange processes taught and/or obvious over Miyake because such is well known and practice in the art as for instance is taught by Lee. As to any further limitations of Claims 17 and 19, these are seen as intended uses which do not impart patentability to the claimed subject matter.

27. ***Claims 1-2 and 6-14 are rejected under 35 U.S.C. 102(b) as being anticipated by JP'610.*** The English language abstract is used in part as an interpretation of the Japanese patent.

28. JP'610 discloses copolymers useful as a precursor of ion exchange resins which are for example a copolymer of chloroethyl methacrylate, glycerol dimethacrylate and optionally methyl methacrylate (abstract). The glycerol dimethacrylate is present in amounts of 30 wt.% or more (abstract), which is a hydrophilic monomer, and the other monomers are hydrophobic monomers. The chloroethyl group is subsequently reacted with trimethylamine to form a quaternary ammonium group (paragraph bridging pages 5 and 6). The copolymer contains 0.01 to 1 meq/g of functional groups (abstract), and the exemplified particle size is 9-12 μm (paragraph bridging pages 4-5). In regards to any further limitations of Claims 11-14, these are intended uses and it is not seen that the particles disclosed by the reference could not be so used.

29. ***Claims 1-2, 6-8, and 10-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP'149.*** The English language abstract is used in part as an interpretation of the Japanese patent.

30. JP'149 discloses anion exchange resins prepared by the chemical modification of a copolymer of glycerin dimethacrylate and glycerin monomethacrylate which has a 70% degree of cross-linking

(abstract). Diethylaminoethyl groups are introduced by reaction of the copolymer with ß-diethylaminoethyl chloride under basic conditions (abstract). As ethylene glycol dimethacrylate (EGDMA)and diethylene glycol dimethacrylate (DEGDMA) are also taught to be used as the cross-linking monomer, it would have been obvious to one of ordinary skill in the art to us such in place of glycerin dimethacrylate, in whole or in part, as they are taught to be useful for equivalent purposes (page 2, upper right hand column). Both EGDMA and DEGDMA qualify as hydrophobic monomers whereas glycerin mono- and di-methacrylates are hydrophilic monomers. The particle size is 1-20 microns and the ion exchange capacity is 0.05-0.5 meq/g (abstract). In regards to any further limitations of Claims 11-14, these are intended uses and it is not seen that the particles disclosed by the reference could not be so used.

31. Claims 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over (i) JP'610 as applied to claims 1-2, and 6-14 above, or (ii) JP'149 as applied to Claims 1-2, 6-8, and 10-14 , and each further in view of Lee.

32. JP'610 and JP'149 discussed above appear to be deficient in not disclosing columns and cartridges packed with the ion exchange materials. However, such is well known in applications using ion exchange materials for instance as is disclosed by Lee discussed above. It would have been obvious to one of ordinary skill in the art to use either cartridges of columns to contain the ion exchange particles of either JP'610 or JP'149 in ion exchange processes because such is well known and practiced in the art as for instance is taught by Lee. As to any further limitations of Claims 16-19, these are seen as intended uses which do not impart patentability to the claimed subject matter.

Art of Interest/Technological Background

33. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following prior art is relevant to other non-elected species of the invention and could be used as a basis of future rejections of the more generic claims. McBurney discloses resinous ion exchange materials prepared by the haloalkylation of styrene/DVB copolymers followed by quaternization with trialkyl amines. Davankov discloses ion-exchange materials made by the grafting of DVB copolymers with monomers such as NVP, followed by oxidation of the vinyl groups to epoxy groups and reactions with amines. Steckler discloses ion exchange materials prepared from cross-linked copolymers of N-

vinyllactams and an amine containing monomer, which is subsequently quaternized. Kalal discloses strongly acidic cation-exchange resins obtained by the chemical fixation of phosphoric acid molecules to a copolymeric matrix by the chemical reaction of the previously prepared polymeric gel with phosphoric acid or its derivative with hydroxyl or epoxy groups present in the gel.

Allowable Subject Matter

34. No prior art has been found which suggests or anticipates ion exchange resins prepared from a copolymer containing glycerol dimethacrylate as one of the monomeric units, which has been further reacted with epichlorohydrin and triethylamine or sodium sulfite to form ion-exchange groups. Thus, other species have also bee examined.

Future Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to D. R. Wilson whose telephone number is 703-308-2398.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on 703-308-2450. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-5408 for regular communications and 703-305-3599 for After Final communications. The unofficial direct fax phone number to the Examiner's desk is 703-872-9029.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-2351.

D. R. Wilson
Primary Examiner
Art Unit 1713